

TABLE 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a.m. (E.S.T.) during November 1933—Continued

Altitude (meters) m.s.l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (83 meters)		New Orleans, La. (2 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (402 meters)		Omaha, Nebr. (306 meters)		Phoenix, Ariz. (338 meters)		Salt Lake City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D.C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	359	0.8	189	0.8	262	0.7	34	1.2	31	1.1	262	1.3	311	0.7	90	1.8	141	3.5	53	1.0	153	1.5	297	1.9
500	28	.8	246	.2	272	4.7	40	1.7	30	4.3	222	2.8	294	3.3	79	3.8	140	1.1	221	4.1	289	5.9		
1,000	44	1.7	137	1.0	287	8.3	321	2.5	28	4.0	256	5.2	306	9.0	76	3.2	313	2.6	228	5.4	287	9.5		
1,500	56	1.5	117	2.5	288	8.9	316	3.2	19	1.6	271	4.2	306	11.5	87	2.0	165	2.6	318	4.4	250	5.1	293	12.4
2,000	92	1.5	61	1.7	298	10.1	294	6.3	356	1.6	289	7.0	300	12.9	99	.8	228	1.3	320	7.3	243	7.5	293	13.1
2,500	59	.9	13	2.4	302	11.8	300	7.6	350	2.0	291	8.4	300	14.0	179	.3	304	2.3	323	9.1	243	7.5	292	14.5
3,000	30	1.9	360	3.7	307	9.8	310	10.4	5	1.0	292	9.7	298	16.4	273	1.6	302	3.0	310	12.2	243	7.5	271	11.8
4,000	189	2.2	351	3.0					168	.9	285	10.6	285	12.4	274	3.7	315	8.9	335	8.2				
5,000									95	3.3							354	2.7	335	8.2				

RIVERS AND FLOODS

By RICHMOND T. ZOCH

[River and Flood Division, Montrose W. Hayes, in charge]

There were no floods in the rivers of the United States during November 1933.

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, W. F. McDonald, in charge]

NORTH ATLANTIC OCEAN

By W. F. McDONALD

The pressure situation.—High pressure was exceptionally persistent during November 1933 from the Azores to the Greenland Sea. The highest pressure over any part of the North Atlantic, (30.61 inches), was reported on the 9th by several ships in the vicinity of the Azores.

The major extra-tropical cyclones remained for the most part in high latitudes. The lowest recorded pressure was 28.19 inches on the 29th at Julianehaab, Greenland. The American Steamship *Quaker City* reported the lowest barometer reading at sea, 28.49 inches, on the 28th near 49°N., 45°W.

Average pressure for the month was below normal over the western Atlantic, especially in the region of Labrador and Davis Strait where the deficiency was more than two tenths of an inch. There was also a smaller deficiency in average pressure over the Iberian Peninsula. Elsewhere, Atlantic pressures were above normal with the greatest excess eastward from Iceland. (See table 1.)

Cyclones and gales.—At the opening of the month and throughout the first 10 days, storminess was mainly confined to the western Atlantic, south of the fiftieth parallel. Gales were mostly moderate to fresh, however, and in only two cases reached whole gale force, south of the Grand Banks.

From the 10th to the end of the month, gales were more widespread and in general more severe, and in the last decade winds of force 12 were encountered by two ships near mid-ocean on the main transatlantic route, in the first instance by the German Steamship *Europa* on the 22d, and again by the Danish Steamship *Maine* on the 26th. Between the 11th and 15th, on the 21st and 22d, and on the 27th and 28th winds of whole gale to storm force were experienced by a number of ships on the northern routes. (See Table of Ocean Gales and Storms.)

The increased intensity of storm conditions at the middle of the month brought about the only marine

casualty of any importance which has been reported. The British Steamship *Saxilby*, bound eastward from Newfoundland to the British Isles on the 15th, called for assistance in latitude 51°50' N., longitude 19°15' W., and stated that the crew was taking to the ship's boats in heavy seas. Several steamers responded to this distress call but no trace of ship or crew could be found.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, November 1933

Station	Average pressure	Departure	Highest	Date	Lowest	Date
Julianehaab, Greenland	Inches 29.41	Inch -.13	Inches 30.08	3 28.19	29.08	29
Reykjavik, Iceland	29.75	+.25	30.49	2 29.08	29.08	11
Lerwick, Shetland Islands	29.95	+.25	30.17	18 29.44	29.44	14
Valencia, Ireland	29.97	+.08	30.41	3 29.14	29.14	15
Lisbon, Portugal	29.95	-.09	30.28	1 29.43	29.43	17
Madeira	30.05	+.04	30.46	1 29.70	29.70	18
Horta, Azores	30.21	+.08	30.58	9 29.78	29.78	27
Bell Isle, Newfoundland	29.65	-.23	30.16	22 28.80	28.80	15
Halifax, Nova Scotia	29.90	-.05	30.58	29 29.28	29.28	15
Nantucket	29.93	-.12	30.47	17 29.14	29.14	27
Hatteras	30.07	-.04	30.61	17 29.55	29.55	26
Bermuda	30.04	-.04	30.36	29 29.66	29.66	7
Turks Island	29.94	-.05	30.06	{ 17, 21 29, 30 } 29.74	29.74	1, 2
Key West	30.05	+.03	30.36	16 29.70	29.70	1
New Orleans	30.15	+.05	30.51	16 29.76	29.76	2
Cape Gracias, Nicaragua	29.89	+.01	29.96	{ 10, 11 17 } 29.76	29.76	1

NOTE.—All data based mainly on a.m. observations, with departures compiled from best available normals related to time of observations, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

This casualty was caused by a deep cyclonic disturbance that, on the 14th, was central south of Iceland moving southeastward. After reaching Ireland on the 15th, the disturbance crossed the Bay of Biscay to the Iberian Peninsula, which it reached on the 18th and thereafter appeared to divide into two parts, one of which moved back again toward Ireland, greatly weakened in intensity. The movement of this disturbance between the 14th and 17th, within which time the *Saxilby* founded, is shown in charts VIII to XI.

Tropical cyclones were a minor feature of the weather of the month. Between the 1st and 7th a moderate disturbance moved on an irregular north and northeastward course from the middle Caribbean region towards Bermuda but no wind stronger than a fresh gale has been reported in connection with it. Another weak and short-lived disturbance arose in the western Caribbean on the 15th and on the 16th caused moderate to fresh gales

between Jamaica and Central America. More complete notes regarding these tropical disturbances appear elsewhere in this issue.

Fog.—Fog was infrequent during November 1933 on the North Atlantic ship lanes, though reported on 1 or 2 days from Cape Hatteras nearly to the Irish coast. It was most frequently encountered east of Newfoundland where, in one 5-degree square, fog was reported on 6 days.

OCEAN GALES AND STORMS, NOVEMBER 1933

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Arizonan, Am.S.S.	New York	Cristobal	22 24 N.	74 06 W.	Oct. 31	3p., Nov. 1	Nov. 1	29.66	E	ENE, 7...	ENE	E., 8...	
Sundance, Am.S.S.	Wilmington, N.C.	Bremen	43 50 N.	45 50 W.	Nov. 2	3a, 3...	Nov. 3	29.36	N	N., 9...	N.	N., 9...	N.
Steel Scientist, Am.S.S.	New York	Cristobal	25 20 N.	74 28 W.	Nov. 3	6a, 4...	Nov. 4	29.67	ESE	SE, 6...	SE	ESE, 9...	Steady.
Meanticut, Am.S.S.	New Orleans	Bremen	39 38 N.	52 38 W.	Nov. 1	1p, 4...	do	29.45	NW	NW, 9...	NW	NW, 10...	N.-NW.
General von Steuben, Ger.S.S.	New York	Galway	46 26 N.	52 50 W.	Nov. 5	5a, 5...	Nov. 6	29.16	WSW	WSW, 8...	SSW	SSW, 10...	WSW.-SSW.
Beemsterdijk, Du.S.S.	Rotterdam	Tampico	32 59 N.	58 18 W.	Nov. 7	2p, 7...	Nov. 7	29.57	SE	S, 5...	SSE	SSE, 8...	SSE.-SW.
Caledonia, Br.S.S.	Halifax	Glasgow	46 26 N.	52 33 W.	do	6a, 8...	Nov. 8	29.10	E	SE, 9...	SW	SE, 10...	SE.-SSSE.
Black Gull, Am.S.S.	New York	Antwerp	50 16 N.	12 42 W.	Nov. 11	6a, 11...	Nov. 12	29.73	NW	NW, 8...	NW	NW, 10...	
Meanticut, Am.S.S.	New Orleans	Bremen	48 30 N.	14 07 W.	do	10p, 11...	do	29.87	NW	NW, 10...	NNW	NNW, 10...	SW.-WSW.-W.
Frederik VIII, Dan.S.S.	New York	Kristiansand	51 10 N.	43 35 W.	Nov. 12	Noon, 13	Nov. 15	29.49	S	SSW, 10...	NNW	SSW, 10...	WSW.-WNW.
Holystone, Br.S.S.	Montreal	Montreal	53 28 N.	42 30 W.	Nov. 13	1p, 13...	Nov. 13	29.02	W	WSW, 10...	WNW	WNW, 11...	W., 11...
Themisto, Du.S.S.	Montreal	Rotterdam	53 21 N.	39 46 W.	do	2p, 13...	do	29.09	S	S, 10...	WNW	WNW, 11...	S.-W.
United States, Dan.S.S.	Oslo	New York	57 30 N.	24 40 W.	Nov. 14	8p, 14...	Nov. 15	28.62	SSE	NNW, 7...	NNW	NNW, 11...	S.-WNW.
West Eldara, Am.S.S.	Rotterdam	Boston	50 46 N.	17 39 W.	do	11a, 14...	Nov. 16	29.58	W	W, 8...	N	NNW, 10...	W.
Stephen, Br.S.S.	Norfolk	Para	34 53 N.	73 15 W.	do	4p, 14...	Nov. 14	29.46	W	WSW, 9...	W	WSW, 9...	W.-WSW.
Boston City, Br.S.S.	Bristol, Eng-land	Philadelphia	50 47 N.	16 17 W.	do	2p, 15...	Nov. 16	29.17	WNW	NW, 10...	N	NW, 10...	WNW.-NNW.
Liberty Glo, Am.S.S.	Rotterdam	Charleston	47 57 N.	18 14 W.	do	8p, 15...	do	29.42	SW	NNW, 10...	N	NNW, 10...	
Dinteldijk, Du.M.S.	Cristobal	Liverpool	47 38 N.	15 17 W.	Nov. 15	3a, 16...	do	29.38	NW	NW, 9...	NE	NW, 10...	NW.-N.
Cefalu, Hon.S.S.	do	New Orleans	12 20 N.	82 25 W.	do	4a, 16...	do	29.62	NW	SE, 8...	N	SE, 8...	S.-E.
Palatia, Ger.M.S.	Mobile	Bremen	46 51 N.	35 33 W.	Nov. 17	Mdt, 17	Nov. 18	29.32	S	WNW, 9...	WNW	WNW, 9...	S.-SSW.-WSW
Examelia, Am.S.S.	Gibraltar	New York	36 19 N.	52 42 W.	Nov. 21	4p, 20...	Nov. 21	29.93	SW	WNW, 4...	W	WNW, 9...	SW.-WSW.
Pres. Harding, Am.S.S.	Southampton	do	46 12 N.	43 48 W.	Nov. 20	6p, 21...	Nov. 22	29.18	S	WSW, 6...	NW	WNW, 10...	S.-W.-WNW.
Boston City, Br.S.S.	Bristol, Eng-land	Philadelphia	47 10 N.	44 29 W.	Nov. 21	7p, 21...	do	29.25	W	NW	8	NNW, 10...	W.-NW.
West Eldara, Am.S.S.	Rotterdam	Boston	48 17 N.	47 01 W.	do	8p, 21...	do	29.28	NW	W, 5...	NW	NNW, 11...	W.-NW.
Europa, Ger.S.S.	English Channel	New York	46 30 N.	38 51 W.	do	1a, 22...	do	29.22	WSW	WSW, 9...	NW	NNW, 12...	WSW.-WNW.
Black Falcon, Am.S.S.	Rotterdam	do	48 26 N.	40 50 W.	do	do	do	29.08	S	WSW, 9...	NW	NW, 10...	SW.-NW.-SW
Caledonia, Br.S.S.	Glasgow	Boston	51 12 N.	40 28 W.	do	48, 22...	Nov. 23	28.78	E	SE, 7...	W	NW, 11...	ESE.-SE.-W.
General von Steuben, Ger.S.S.	Galway	New York	50 42 N.	39 10 W.	Nov. 22	5a, 22...	Nov. 22	28.92	S	N	NNW	NNW, 11...	SW.-N.
City of Dalhart, Am.M.S.	Gibraltar	do	36 24 N.	71 02 W.	do	3p, 22...	do	29.84	SW	SW, 8...	NW	SW, 9...	SSW.-SW.
Kentbang Head, Br.S.S.	Montreal	Dublin	48 35 N.	44 52 W.	Nov. 26	8a, 26...	Nov. 26	29.19	W	W, 10...	NW	W, 10...	None.
Maine, Dan.S.S.	Harburg, Germany	Wilmington, N.C.	46 57 N.	35 55 W.	do	6p, 26...	Nov. 27	29.09	W	WNW, 10...	N	WNW, 12...	Steady.
Spoldoleine, Belg.M.S.	Rouen	New York	48 13 N.	28 48 W.	Nov. 27	3a, 27...	do	28.55	NW	SW, 5...	NW	NW, 11...	S.-SW.-NW.
Champlain, Fr.S.S.	do	Plymouth	42 20 N.	50 22 W.	Nov. 26	4p, 27...	do	29.07	SE	SSW, 9...	SW	SW, 11...	S.-SW.
Executive, Am.S.S.	Lisbon	do	37 05 N.	64 10 W.	do	do	Nov. 28	29.45	S	WNW, 10...	NW	SW, 11...	SSW.-SW.
Syros, Am.S.S.	Rotterdam	Galveston	41 52 N.	22 27 W.	do	do	do	29.18	W	W, 9...	NW	WNW, 10...	W.-NW.
Kertosono, Du.S.S.	Gibraltar	Halifax	42 23 N.	60 35 W.	do	4p, 27...	Nov. 27	29.21	S	WSW, 10...	W	WNW, 10...	None.
Europa, Ger.S.S.	New York	do	43 15 N.	46 45 W.	Nov. 27	4a, 28...	Nov. 28	29.06	SSW	SW, 8...	W	NW, 10...	SW.-NW.
Quaker City, Am.S.S.	Dundee	Boston	49 48 N.	45 50 W.	Nov. 28	8a, 28...	Nov. 29	28.49	SE	SW, 9...	NW	SW, 9...	
Spoldoleine, Belg.M.S.	Rouen	New York	46 24 N.	38 41 W.	Nov. 29	3p, 29...	do	29.17	W	WNW, 10...	WNW	WNW, 10...	WNW.-NW.
Georgia, Dan.S.S.	Newcastle-on-Tyne	Norfolk	57 10 N.	25 03 W.	Nov. 28	11a, 29...	Nov. 30	29.02	SSE	SSE, 10...	WNW	WNW, 10...	SSE.-SW.-WSW.
NORTH PACIFIC OCEAN													
President Cleveland, Am.S.S.	Victoria	Yokohama	51 34 N.	163 46 W.	Nov. 1	4p., Nov. 1	1 Nov. 3	29.43	SSW	SW, 8...	WNW	NNW, 9...	SW-S.
Grays Harbor, Am.S.S.	Seattle	do	51 49 N.	161 16 W.	do	4a, 2...	do	29.34	S	SSW, 8...	WNW	SSW, 9...	SSW-W.
Yayoi Maru, Jap.S.S.	Kobe	Portland, Oreg.	40 45 N.	151 45 E.	Nov. 2	10p., 2...	do	29.55	S	S, 8...	W	SSW, 9...	
Hakoneisan Maru, Jap.M.S.	Yokohama	Los Angeles	45 02 N.	173 02 E.	Nov. 3	8a, 4...	Nov. 4	29.64	SSE	S, 9...	WNW	S, 9...	S.-WNW.
San Pedro Maru, Jap.M.S.	Monterey	Yokohama	35 27 N.	146 38 W.	do	6a, 4...	Nov. 5	29.58	SE	S, 7...	SW	S, 9...	SSE.-S.-SSW.
Michigan, Am. S.S.	Columbia River	Shanghai	49 30 N.	171 42 E.	Nov. 4	8a, 4...	do	29.59	SSE	W, 6...	WSW	WSW, 10...	SSE-W.
President Cleveland, Am.S.S.	Victoria	Yokohama	49 23 N.	170 03 E.	do	6p, 4...	do	29.77	S	S, 9...	WSW	S, 9...	S-WNW.
Teyo Maru, Jap.M.S.	Los Angeles	Hakodate	46 15 N.	161 55 E.	Nov. 7	8a, 7...	Nov. 8	29.17	SSE	SSE, 10...	W	SSE, 10...	SSE-W.
President Cleveland, Am.S.S.	Victoria	Yokohama	43 55 N.	157 00 E.	do	11a, 7...	do	29.35	SE	SE, 10...	WNW	WSW, 11...	SE-NW.
Yayoi Maru, Jap.S.S.	Kobe	Portland, Oreg.	49 30 N.	179 30 W.	do	5a, 8...	do	29.61	SSE	SSE, —	WNW	SSE, 8...	
Michigan, Am.S.S.	Columbia River	Shanghai	47 05 N.	160 54 E.	do	5p, 7...	Nov. 9	29.38	SSE	S, 10...	W	S, 10...	SSE.-S.-WSW.
Grays Harbor, Am.S.S.	Seattle	Yokohama	49 52 N.	170 22 E.	Nov. 8	6a, 10...	Nov. 10	29.31	SSE	WSW, 8...	N	W, 10...	WSW.-WNW.
Ohioan, Am.S.S.	Los Angeles	Balboa	15 30 N.	98 00 W.	Nov. 10	9a, 10...	Nov. 11	29.84	NE	N, —	NW	NW, 9...	N.
Charcas, Am.S.S.	Champerico	Los Angeles	15 14 N.	94 38 W.	do	4a, 11...	do	29.87	NNW	NNE, 7...	NNE	NNE, 8...	NNE-ENE.
San Pedro Maru, Jap.M.S.	Yokohama	San Francisco	44 48 N.	155 15 W.	do	6p, 10...	Nov. 12	30.08	NNE	NNE, 8...	NW	NNE, 8...	
Seattle, Am.S.S.	Philippine Islands	Los Angeles	20 00 N.	135 30 E.	do	4p, 11...	do	29.19	NW	SW, 8...	SSE	SSE, 9...	WSW.-SW.-SSW.
Point Sur, Am.S.S.	Balboa	do	14 39 N.	94 53 W.	Nov. 11	8p, 11...	do	29.85	NW	N, 7...	NE	N, 9...	NNW.-N.
W. S. Miller, Am.S.S.	Balboa	Los Angeles	15 20 N.	95 30 W.	do	18, 12...	do	29.86	NE	NNW, 9...	NNW	NNW, 9...	NE-NNW
Yayoi Maru, Jap.S.S.	Kobe	Portland, Oreg.	49 25 N.	130 10 W.	Nov. 13	6a, 13...	Nov. 14	29.67	SE	SE, —	SE	SE, 9...	

¹ Position approximate.² Barometer uncorrected.